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CONTENTS:

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THE

AUSTRALASIAN SCIENTIFIC MAGAZINE.

No. II. SEPTEMBER 1, 1885. Vol. I.

DESCRIPTIVE NOTES ON PAPUAN PLANTS.

BY

BARON FERD. VON MUELLER, K.C.M.G., M. & PH.D., F.R.S., Etc. Etc.

From 1875 to 1877 the writer of the present notes issued five small parts of a publication on "Papuan Plants," for which issue the material became directly available to him and this largely through the kindness of the Missionaries in the south-eastern parts of New Guinea. Since then the work was discontinued, not only because the access of actually new additional material proving scanty, but also because Dr. E. Beccari, who was personally engaged in Papuan Explorations, had commenced in 1877 his learned and splendidly illustrated "Malesia," in which work the Papuan plants, gathered mainly by this distinguished naturalist, were to appear along with numerous others, obtained by him in the Sunda-Islands. Although now six parts of the "Malesia" have appeared, the last in 1884, only a very limited number of natural orders became as yet investigated, which is not surprising, when the vastness of the material, accruing from Dr. Beccari's long itinerations, is considered. Under these circumstances it seemed not advisable, to postpone Australian researches concerning the Flora of New Guinea any longer, merely on account of similar engagements of the Italian Phytographer, especially also as all our material here came from the south-eastern portion of the great island, whereas Beccari's

Papuan collections were accumulated in the north-western part, except some of those, which from Signor D'Albertis's second dashing expedition passed into his hands. An additional reason for resuming, with ministerial sanction, the Victorian publication on Papuan plants is given by the recent despatch of an Expedition under Capt. Everill through the Geographic Society of Australia and under the auspices of the Governments of New South Wales and Victoria, to the Aird-River and the mountainous tracts of country beyond,—rich results also for phytology being expected from that expedition, to be rendered known from Australia. Moreover the almost simultaneous start of Mr. H. O. Forbes, to ascend the Owen Stanley's Ranges from Port Moresby, a feat long urged by the writer of the present essay, holds out further great hopes of adding very extensively also to our knowledge of the Papuan Flora, and that from regions, in which the endemic characteristics of the vegetation must culminate. Also from this expedition, though planned by scientific societies of Britain, we in Australia may expect to benefit in our own Papuan researches, half of the expenditure of Mr. Forbes's enterprise being defrayed by our Geographical Society here from the Government fund under its control. Thus it becomes really requisite now, to collect the scattered notes of the New Guinea Flora, which appeared since the discontinuance of the "Papuan Plants" in various local periodicals from researches of the writer of this work; and it seems also advisable, to add notes on those records of Dr. Beccari's New Guinean plants, which did not appear in the Malesia, but in different monographic essays mostly by other authors. Through the means, now here adopted, the furtherance of elucidations of the New Guinean vegetation will become facilitated, as well in Florence as in Melbourne and indeed elsewhere also, more particularly so as likely through methodic explorations under the aid of all the Australian Colonial Governments the resources of the great Papuan Island, in which we here are so prominently interested, will become early and extensively revealed.

Melbourne, June 1885.

NYMPHÆACEÆ.

Barclaya Mottleyi.

J. Hooker in transact. Linn. Soc. xxiii. t. 21.

Fly River; D'Albertis.

Noted by Dr. Beccari in Signor D'Albertis's "New Guinea," ii. 396.

MENISPERMEÆ.

Stephania hernandifolia.

Walpers, repertor. bot. syst. i. 96.

Near Port Moresby: Rev. W. G. Lawes.

MONIMIACEÆ.

Mollinedia Huegeliana.

Tulasne in Annal. des scienc. nat. sér. quatr. iii. 45.

Lorne Range; Rev. J. Chalmers.

Fruit-bearing branchlets seen, apparently belonging to this species. A second species occurs on Owen Stanley's Range, but is known only from very imperfect specimens.

LAURINEÆ.

Massoia aromatica.

Beccari in D'Albertis, New Guinea ii. 398.

On the Fly River and in various other localities.

The spicy bark of this tree is much sought by the Malays and may possess medicinal virtue.

CRUCIFERÆ

BRASSICA TIMORIANA.

Sinapis Timoriana, De Candolle prodr. i. 219; De Lessert, icon. ii. 88; Decaisne in Nouv. annal. du mus. iii. 425; Miquel, fl. Ind. Batav. i. pars alt. p. 94.

Near the Astrolabe Range; E. G. Edelfelt.

PITTOSPOREÆ.

PITTOSPORUM FERRUGINEUM.

Aiton, hort. Kew, sec. edit. ii. 27.

On Astrolabe Range; W. Armit.

First noted as Papuan in the "Vict. Naturalist," April 1885.

DROSERACEÆ.

DROSERA INDICA.

Linné, spec. plantar. 282.

Jervis Island; Rev. W. G. Lawes.

FLACOURTIACEÆ.

PANGIUM EDULE.

Reinwardt in Blume's Catal. van Gewassen in Lands plantentuin te Buitenzorg p. 112.

Fly River; D'Albertis. Near the Finisterre Mountains; Mikluho-Maclay.

VIOLACEÆ.

HYBANTHUS ENNEASPERMUS.

F. v. M. fragm. phytogr. Austr. x. 81.

Jervis Island; Rev. James Chalmers.

POLYGALACEÆ.

POLYGALA LEPTALEA.

De Candolle, prodr. i. 325

Murray Island; Rev. J. Chalmers.

GERANIACEÆ.

OXALIS CORNICULATA.

Linné, spec. plant. 435.

South Cape; Rev. J. Chalmers.

STERCULIACEÆ.

PTEROCYMBIUM JAVANICUM.

R. Brown in Horsfield's plant. Javan. rar. p. 219, t. xlv.

Fly River; D'Albertis, according to Beccari, l. c. p. 396.

TILIACEÆ.

ARISTOTELIA PAPUANA.

F. v. M. in Wing's S. Sc. Record, Aug., 1881.

Near the Astrolabe Range; Rev. James Chalmers.

MALVACEÆ.

URENA SINUATA.

Linné, sp. pl. 692.

Fly River; D'Albertis.

DIPTEROCARPEÆ.

VATICA PAPUANA.

Dyer in Trimen's journal of Botany 1878, p. 99.

Mount Arfak; Beccari.

EUPHORBIACEÆ.

BREYNIA CERNUA.

J. Mueller in De Cand. prodr. xv. part. ii. 439.

Kudipo and Aniwarupu near Kerepunu; Rev. James Chalmers.

ALEURITES TRILOBA.

R. and G. Forster, char. gen. III, t. 56.

Fly River; D'Albertis.

MELIACEÆ.

MELIA AZEDARACH.

Linné, spec. plant. 384.

Near Port Moresby; Rev. W. G. Lawes.

AGLAIA ZIPPELII.

Miquel, Annal. mus. bot. Lugd. iv. 55.

New Guinea, with A. litoralis (Miq. v. 4); Zippelius.

SAPINDACEÆ.

APHANIA CUSPIDATA.

Radlkofer in D'Albertis's New Guinea ii. 396.

Fly River; D'Albertis.

CUPANIA BRACHYPHYLLA.

Arytera brachyphylla, Radlkofer l. c. p. 396.

HARPULLIA ANGUSTIFOLIA.

Radlkofer, l. c. p. 396.

AMENTACEÆ.

QUERCUS D'ALBERTISII.

F. v. M. in Vict. Naturalist, Dec. 1884.

Fly River; D'Albertis.

QUERCUS GULLIVERI.

F. v. M. in Vict. Naturalist, Febr. 1885.

Astrolabe Range, Edelfelt.

CASUARINEÆ.

CASUARINA NODIFLORA.

G. Forster in Murray syst. veget. p. 840 (1784.)

Astrolabe Range, common; G. Belford.

STACKHOUSIACEÆ.

STACKHOUSIA VIMINEA.

Smith in Rees cycl. xxxiii. (1819).

Jervis Island; Rev. James Chalmers. This locality (about 9° 55′ S.) has been regarded as Papuan, being nearer to New Guinea than to any part of Continental Australia.

AMARANTACEÆ.

GOMPYRENA GLOBOSA.

Linné, spec. plant. 224.

South-eastern part of New Guinea; Armit.

POLYGONACEÆ.

MUEHLENBECKIA PLATYCLADA.

F. v. M. in Hooker's bot. magazine, t. 5382.

South-eastern New Guinea; Rev. James Chalmers.

COMBRETACEÆ.

GYROCARPUS AMERICANUS.

N. Jacquin, select. stirp. Amer. hist. 282, t. 178.

Aroa River; W. Armit.

QUISQUALIS INDICA.
Linné, spec. plant. ed. sec. p. 556.
Fly River; D'Albertis, according to Dr. Beccari.

RHAMNACEÆ.

ALPHITONIA EXCELSA.
Reisseck in Endl. gen. pl. 1098.
South Cape; Rev. James Chalmers.

LEGUMINOSÆ.

CROTALARIA MEDICAGINEA.
Lamarck, encycl. méth. ii. 201.
Jervis Island; Rev. James Chalmers.

INDIGOFERA HIRSUTA.
Linné, spec. plant. 751.
Near Port Moresby; Rev. W. G. Lawes.

DESMODIUM PULCHELLUM.
Bentham, flor. Hongkong, 83.
Astrolabe Range; E. G. Edelfelt.

DESMODIUM TRIQUETRUM.
De Candolle, prodr. ii. 326.
Near Port Moresby; Rev. W. G. Lawes.

DESMODIUM POLYCARPUM.
De Candolle, prodr. ii. 334.
Near Owen Stanley's Range and on Jervis Island; Rev. James Chalmers

ZORNIA DIPHYLLA.
Persoon, synops. plant. ii. 318.
Near Port Moresby; Rev. W. G. Lawes.

ERIOSEMA CHINENSE.
T. Vogel in Meyen's Beitr. zur Bot. 31.
Near South Cape; Rev. James Chalmers.

ERYTHRINA INDICA.
Lamarck, encycl. méth. ii. 391.
Yala River; W. Armit.

CASSIA ABSUS.
Linné spec. plant. 376.
Port Moresby and Jervis Island; Rev. J. Chalmers.

ADENANTHERA PAVONINA.
Linné, spec. Plant. 384.
Fly River; D'Albertis.

SAXIFRAGEÆ.

POLYOSMA HELICIOIDES.

Leaves on very short stalks, lanceolar-ovate, remotely and pointedly denticulated, when young beset on the under side with scattered appressed hair; pedicels extremely short; flowers rather small, very slender, outside imperfectly grey-silky; anthers shorter than the filaments, the latter as well as the style slightly hairy.

On Astrolabe Range; George Belford.

This plant seems specifically different from the Javanic P. ilicifolia already in still shorter leaf-stalks and more slender flowers; the fruit remains unknown, and may exhibit further differences. Like other congeners this one also reminds of some Helicias in aspect.

THYMELEÆ

PIMELEA CORNUCOPIÆ
Solander in Vahl. enum. plant. i. 305.
Near Astrolabe Range; George Belford.

PHALERIA BLUMEI.
Bentham, flora Austral. vi. 38.
Murray Island; Rev. James Chalmers.
The length of the calyx seems subject to some variation.

PHALERIA COCCINEA.
Pseudais coccinea, Decaisne in Annal. des Scienc. nat. sér. second xix. 40.
Drymispermum coccineum, Beccari in D'Alb. New Guinea ii. 398.
Fly River; D'Albertis.

PROTEACEÆ.

GREVILLEA EDELFELTII.
F. v. M. in Vict. Naturalist, Febr. 1885.
Astrolabe Range, on damp rocks in shady places; Edelfelt.
Generic definition doubtful, as neither flowers nor fruits were brought.

RUBIACEÆ.

BIKKIA BRIDGEANA.
F. v. M. in Vict. Naturalist, Febr. 1885.
Dixon's Bay, Bessel Island; Capt. Cyprian Bridge, R.N.

OLDENLANDIA AURICULARIA.
F. v. M. syst. Census of Austr. plants, 74.
Cloudy Mountains; Capt. Bridge.

OLDENLANDIA PANICULATA.
Linné, sp. pl. sec. ed. 1667.
Murray Island; Rev. J Chalmers.

CUCURBITACEÆ.

TRICHOSANTHES LONGIFLORA.
Cogniaux in A. & C. de Cand. monograph. phanerogam. iii. 374.
Soron; Dr. Beccari.

MOMORDICA MIXTA.
Roxburgh, hort. Benghal. 70.
Ramoi and Andai; Dr. Beccari.

BENINCASA CERIFERA.
Savi in Bibl. Ital. ix. 158.
New Guinea; D'Albertis.

MELOTHRIA MUCRONATA.
Cogniaux in A. & C. de Cand. monogr. phanerog. iii. 608.
Andai; Beccari.

ZANONIA INDICA.
Linné, spec. pl. ed. sec. 1457.
Fly River; D'Albertis.

ZANONIA MACROSPERMA.
Blume, Bijdrag. 937.
Andai and Aru Islands; Beccari, according to Cogniaux.

ALSOMITRA BECCARIANA.
Cogniaux in A. & C. de Cand. monogr. phanerog. iii. 932.
Kei Island; Beccari.

COMPOSITÆ.

VITTADINIA BRACHYCOMOIDES.
F. v. M. fragm. phytogr. Austr. v. 86.
Near Astrolabe Range; Rev. J. Chalmers.

CENTIPEDA ORBICULARIS.
Loureiro, flor. Cochinchin. ii. 492.
Cloudy Mountains and Lorne Range; Capt. Bridge.

DICHROCEPHALA ERECTA.
L'Heritier in Desf. catal. hort. Paris, 1804, p. 95.
Lorne Range; Capt. Bridge.

BLUMEA LACTUCIFOLIA.
Wallich, numerical list 3088.

Soron; Dr. E. Beccari.

This and the six following New Guinean Compositæ are given from Signor U. Martelli's treatise on Dr. Beccari's Malayan and Papuan Composites in Caruel's Nuovo Giornale Botanico xv. 281-305 (1883).

BLUMEA CHINENSIS.
De Candolle, prodr. v. 444.

Mount Arfak; Dr. Ed. Beccari.

BLUMEA ARFAKIANA.
Martelli in Caruel giorn. xv. 292.

Mount Arfak; Dr. Beccari.

BLUMEA VIRENS.
De Candolle in Wight contrib. 14.

Humboldt's Bay; Dr. Beccari.

BLUMEA AROMATICA.
De Candolle, prodr. v. 88.

Fly River; D'Albertis.

MICROGLOSSUM VOLUBILE.
De Candolle, prodr. v. 320.

Mount Arfak; Dr. Beccari.

ANAPHALIS LONGIFOLIA.
De Candolle, prodr. vi. 271.

Mount Arfak; Dr. Beccari.

GNAPHALIUM LUTEO-ALBUM.
Linné, spec. plant. 851.

Near Port Moresby; Rev. W. G. Lawes.

GYNURA SARMENTOSA.
De Candolle, prodr. vi. 298.

Soron; Dr. Beccari; also in S.E. New Guinea; Rev. W. G. Lawes.

CREPIS JAPONICA.
Bentham, flora Hongkong, 194.

Lorne Range; Capt. Bridge, R.N.

CAMPANULACEÆ.

WAHLENBERGIA GRACILIS.
Alph. de Candolle, monogr. campan. 142.

Murray and Jervis Islands; Rev. James Chalmers.

CANDOLLEACEÆ.

CANDOLLEA ULIGINOSA.
F. v. M. syst. Census of Austr. pl. 86.

Jervis Island; Rev. J. Chalmers.

GOODENIACEÆ.

SCÆVOLA AMBOINENSIS.
Miquel, Annal. Mus. bot. Lugd. Batav. i. 210.

Mount Astrolabe; G. Belford.

ERICACEÆ.

RHODODENDRON TOVERENÆ.
F. v. M. in Vict. Naturalist i. 101 (1884).

On Mount Owen Stanley's Range, at a height of several thousand feet; C. Hunstein.

SAPOTACEÆ.

ILLIPE MACLAYANA.
F. v. M. in Vict. Naturalist i. 168.

Near the Finisterre Mountains.

ILLIPE ERSKINEANA.
F. v. M. in Melbourne Chemist, April 1885.

South Cape; Rev. J. Chalmers and Rev. W. Gill.

Since the description of this economically important species was published, the telling work of the Rev. Will. Wyatt Gill and the Rev. James Chalmers (on their missionary travels in New Guinea from 1877-1885) has reached me, in which at p. 329 is referred to the Poti-Poti as an umbrageous tree, attaining sixty feet in height, and yielding a globular one-seeded fruit as much as three inches diametrically wide, of apple-smell and agreeable peculiar taste.

(To be continued.)

COMPLEMENTARY MAGNETISM.

BY

HERR R. VON HAAP.

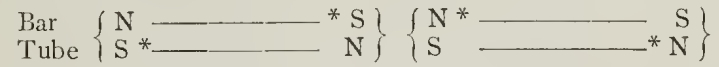
A magnet has aptly been described as a steel bar in a cyclone of electricity. Cut the bar in two and (the whirlwind continuing) each piece becomes a magnet. Magnetise a ring, and the whirlwind is spent upon itself, and no magnetic action is shown. Break the ring, and the latent or rather neutralised magnetism becomes active.

The tendency of a bar magnet to point towards the poles and dip according to the latitude, is well understood. But there is another magnetic force so rare in its occurrence, and so slight in its power, as to be neutralised by the former forces. This is the sympathy of complementary magnets.

In my travels in India I learnt a great deal of the so-called magic of the "Mahattmahs" or professional conjurers of that country. And I am forced to the conclusion that much of their doings that excite such wonder is simply the use of an extended knowledge of sciences we possess. It was here (at Cawnpore), that I first saw one of a pair of complementary magnets used for telegraphing, to the great wonder and awe of the natives, who saw in it something supernatural.

These magnets, I afterwards learnt, are prepared by first magnetising a straight steel bar, tempered to a perfectly even hardness, and then cutting it exactly in half. Now, to neutralise the tendency to point and dip to the

poles, a steel tube capable of holding the bar, and of equal length and weight, is treated in the same way, and the bar magnets, covered with insulating material, are inserted in the tube magnets, *with the poles* and *cut surfaces reversed.* Thus (*represents cut ends).



These compound magnets are now mounted compass-fashion. They have no tendency as regards the poles of the earth, because that is balanced. But the tendency to move in sympathy is obviously doubled. Whatever the distance between them they tend to lie parallel.

All that is necessary, then, to telegraph from the holder of one of a pair of magnets to the other, is a code of signals like that of the old needle telegraph. The sender moves his needle according to the code, and, its fellow moving in sympathy, the receiver reads off the message. Of course an exact duplicate as to form, hardness, and weight of either outer or inner magnet intervening, would cause a false motion or prevent communication, as *induction* does in a system of telephone wires. But such an accidental duplicate would obviously be more rare than an extra key to a Bramah lock, and this difficulty is practically never experienced by those clever natives of India, who use these and such means for retaining a superstitious influence over their more ignorant fellow-countrymen.

SEMI-TROPICAL FLORIDA.

BY

A SETTLER.

In the south of Florida lies Lake Worth ; south of Jacksonville, by the waterways, 470 miles; and by schooner direct, 300 miles. It lies immediately along the Atlantic coast, in latitude 26° 40′. The lake itself is twenty-three miles long, and less than one mile wide, extending north and south parallel with the ocean shore, and separated from the ocean by a narrow strip of land generally less than half a mile wide. From the western shore of the lake, looking across the lake and strip of land, we can see the masts and riggings of ships sailing on the Atlantic southward, on the way from New York to New Orleans. Such vessels, going in that direction, keep between the Gulf Stream and the land.

Lake Worth's special claims to attention over the more northern parts of Florida lie in her climate, her productions, and sporting fields. The climate is unique, there being no duplicate of it on this continent, and probably none in the world; the productions are more tropical than those everywhere farther north of it; and the sportsman finds abundance of fish and game. The peculiarity of the climate arises from two causes, the Gulf Stream and the trade winds. The former flows northwards within a few miles of us, and when the ocean winds are strong from the east the stream is forced to within one mile of our coast. This stream of water, at a temperature of 82 deg. Fahr., is some twenty-five or thirty miles wide, and in some places 2000 feet deep, flowing at the rate of some four miles an hour. As it advances northward it gets wider and shallower and of lower temperature; but in this neighbourhood the above figures are stated as close to the prevailing facts. The temperature varies very little during the year. Now the trade winds, drawn southward by the up-flowing heated air of the tropics, and deflected westward by the rotation of the earth, blow constantly, year in and year out, in a south-westerly direction in this latitude. These perpetual north-east winds bring to our shores the air attempered by the Gulf Stream, and thereby keep the temperature here always almost the same, summer and winter. This pouring over us an atmosphere of about 80 deg. Fahr. cools our summers and warms our winters, besides keeping a never-dying breeze to fan us. The thermometer hardly ever rises above 90 deg. in the shade in midsummer, and last winter it fell at no time below 45 deg. The older settlers have seen frost in places, but so light as to nip none but the tenderest and youngest of vegetables. The climate is, as far as the destruction of vegetable life is concerned, well-nigh tropical. Professor Curtiss, of the Agricultural Department in Washington, who spent several years exploring South Florida for botanical specimens, reports that vegetation on the Atlantic coast is more than a degree and a half more tropical than it is on the Mexican Gulf coast, and that iso-floral lines would run from north-east on the Atlantic to south-west on the Gulf. During the hottest part of our sunniest midsummer days I rarely ever find the heat oppressive, if I will keep in the shade and in the breeze, and a sultry night is almost unknown. In August I have felt chilly oftener than I have felt the swelter of overheat. In the sun it is hot, of course; but to the man that can command his time during the heat of the day, there is no more delightful climate in the world. And for about four hours in the morning and three hours in the afternoon there is no more delightful climate for the labourer in the fields.

From the rest of Florida, however, this Lake Worth region is distinguished for its productions, growing as it does several important fruits that cannot be grown farther north, or can be grown only with extreme and expensive precautions against cold. In all Florida north of this precautions against frost must be taken in growing almost all the fruits known as Floridan, such as the orange, the lemon, the banana, the pine-apple, citron, grape fruit, the several anonas, the guava, and so on. The same can be grown in this climate successfully without such precautions. And in addition to these, we can grow several that may be said to be too tropical for all regions further north, among which are the lime (the Tahiti, being the finest, will not live without careful watching everywhere north of us), the date, the cocoa-nut, the mango, the tamarind, the almond, the pawpaw, and several others.

The fruits thus far grown here, and planted most extensively, are the cocoa-nut, the lime, the pine-apple, and banana. There are about 25,000

cocoa-nuts now planted in groves along the lake, and others are being planted. The tree bears in about six years, having, when in full bearing, at ten years, say, between 100 and 300 nuts a year. A hundred, however, is considered a good average for the tree. A company have planted just south of us a grove of 214,000 nuts. They are put about 100 to the acre generally. The nuts now sell at six cents apiece; but the market price, after the flurry of novelty passes away, will probably be about two cents each, making the crop worth about two dollars a tree a year, or 200 dollars the acre. Limes have been grown with great success here. Captain E. N. Dimick, who has lived here some ten years, has a lime tree near his kitchen, from which, he assures me, he one year gathered and sold fruit to the value of twenty dollars. This is, of course, an exceptionally fine tree. It was at the time referred to less than five years old. The lime may be planted 100 to the acre. It is not easy to reckon the probable value of a lime grove; but it would be safe to count on perhaps three dollars the tree, or 300 the acre, with good attention. But the possibilities, as in the one instance of Captain Dimick, are immense. Twenty dollars the tree at the same rate would be 2000 dollars the acre. The limes may be pickled in brine and kept indefinitely; but the price of these is much less than for the fresh limes, the barrel of pickles bringing from five to seven dollars in the market, while the fresh sometimes reach fifteen dollars a barrel. They are, however, frequently sold, as are oranges and lemons, in bushel crates, or boxes.

The pine-apple has been grown here, but has not received the attention it probably merits as a tropical fruit. The fruit grows on a stalk from one to two feet in height. They may be planted, some say, as many as 15,000 to the acre; but, perhaps, 10,000 to the acre—which is two feet apart for the plants—would be better. They fruit in from eighteen to twenty-four months after setting out the slip or sucker, the usual way of planting. It is considered a good yield to get seventy-five per cent.—that is 7500 from 10,000 plantings. With good attention and cultivation a greater yield can be secured. The common small pine-apple usually sells for about ten cents, large ones more, smaller ones less. Better varieties, such as the Trinidads, command larger prices, as they grow larger fruit, choice fruit bringing sometimes a dollar each. In London the prices are often very high. Messrs. Robert Tucker and Co., of that city, mention some pine-apples from Florida that sold a few years ago (in 1882), there for twenty-five shillings each. And I have seen mention of one weighing fifteen pounds that sold during the season in London for fifteen dollars. It seems reasonable to believe that the grower here, where cold does not interfere with the fruit, may count on at least ten cents for the common or Spanish fruit, and fifty cents each for the Trinidads.

The banana grows on a stalk from six to ten feet high, and may be planted in hills eight feet apart, giving 680 hills to the acre. The yield of a hill is one, two, or three bunches of bananas, having between one hundred and two hundred fingers. The net price to the grower is about a dollar a bunch. A thousand bunches to the acre is not unreasonable under good cultivation. The sportsman finds in the woods an abundance of deer, an occasional bear and turkey, with plenty of squirrels, rabbits, opossums, wild cats, quails, eagles, etc.; while on the waters ducks are everywhere and nearly all the year. The waters abound in fish, the best of which is the pompano. The lake is salt water. It was originally fresh water, but for the convenience of travel and traffic an inlet has been cut that lets in the Atlantic salt water.

The community—or settlement, as it is called—numbers something less than one hundred, and is one of the two settlements in Dade County, the other being Miami, the county seat. Dade County embraces 7200 square miles of territory—almost as large as Wales—and its population was in 1880 just 257—that is, one to every twenty-eight square miles. Lake Worth has an hotel, but no church, schoolhouse, nor gaol; has no roads, but all travel is done in boats and on foot. Mail once a week. Life frontier. Population mixed—Americans from ten different States, Englishmen, Irishmen, Swedes, Norwegians, Minorcans, negroes; and, withal, a peaceful, law-abiding community. The present settlement was started some fourteen years ago.

REPORT ON THE GENERAL GEOLOGY OF THE YORKE PENINSULA, WITH REFERENCE TO THE PROBABILITY OF ARTESIAN WATER SUPPLY BETWEEN CLINTON AND CURRAMULKA.

BY

HENRY Y. L. BROWN, F.G.S., F.L.S., Etc.

(Government Geologist of South Australia).

The greater portion of the hundreds of Clinton and Maitland, and portions of the hundreds of Kilkerran, Cunningham, and Curramulka are constituted of granite and metamorphic rocks, which, with overlying patches of Palæozoic limestone, marble, grit, conglomerate, and sandstone, covered over with a thin capping of tertiary deposits, which prevents their being seen more frequently at the surface. In these hundreds, the older rocks obtain their greatest elevation, which is about 500 to 600 feet. Over the remaining portion of the Peninsula the covering of tertiary and recent formation is thicker, and together, with the older rocks, at a lower elevation, the latter being chiefly seen to out-crop at various points on the sea-coast; they doubtless, however, are close to the surface at many places inland, although not visible.

Granite and Metamorphic Rocks.—At the old Parara mine, mica, schist, hornblende, and quartz-rose rocks, with quartz-veins, penetrated by dykes of greenstone and coarse granite, appear over a small area. Southward, along the coast of Muloowurtie, pink granulite with silicious limestone and hornblendic rocks, with ferruginous lode formations containing copper, are exposed.

Copper has been mined for at several places.

From Point Yorke round the coast to near Point Turton, granite, gneissic granite, gneiss, hornblende, and silicions rocks, greenstone and granite dykes, form the base of the chief headlands and points such as Cape Spencer, West Cape, Daly Head, etc.

At Port Victoria also are crystalline beds of silicious and hornblendic rock with granulate, and granite dykes; silicious, feldspathic, and gneissic micaceous rocks, and a massive dyke of greenstone, diorite, hornblende rock and syneite.

Northward, along the coast at Wallaroo and Moonta, I have noticed previously out-crops of similar rocks.

Near Maitland there are dykes of graphic and ordinary granite in metamorphic grit.

The foundation of the whole Peninsula may be, therefore, inferred to be granite and metamorphic rocks, with their accompanying dykes, uncomfortably on which rest inclined beds of conglomerate, grit, and sandstone, and crystalline and silicious limestone of Palæozoic age. The principal outcrops of the latter are in the neighbourhood of Ardrossan and Curramulka; they are also visible on the coast of Muloowurtie, near Port Vincent, and, near Maitland and Moonta. They may, however, be expected to underlie the tertiary formations over a considerable area.

At Curramulka, the crystalline limestone is extensively hollowed out into caves, which are caused by the action of the water acting originally on fissures in the strata, which caves, could they be followed down, would lead no doubt to the discovery of still larger caves containing large accumulations of water.

This limestone is a continuation southwards of that forming the base of the South Hummocks Range, and is most probably connected with that on the east side of Spencer's Gulf.

Limestone, when in continuing masses, as it is well known, affords good storage space for water on account of its cavernous character, and owing to the fact that it dissolves in water. The extensive distribution of travertine limestone over the greater portion of the area, which I take to be deposited from springs, indicates that an immense quantity of carbonate of lime has been removed by solution from the rocks below, leaving large spaces to be filled with the water which is constantly passing from higher ranges to the sea.

Tertiary and Recent Formations.—Horizontal beds of tertiary age consisting of limestone, loam, mottled sandy clay, sandstone, shell, nodular and conglomeritic limestone, and calacreous sandstone, etc., on the coast, and limestone, loam, clay, gravel, and sand-drift filling up the valleys of the higher land, form a covering of varying thickness to the rocks previously described.

These beds fill up the basins on the eroded surface of the older rocks, whether formed by the sea or from rivers; and it is in the porous beds of sand or gravel intervening between impervious beds of clay that water is likely to be met with, by boring, at a pressure sufficient to bring it to the surface.

The localities where the conditions are most favourable are on the low ground forming a narrow band along the western coast of Tiparra, Kilkerran and Wauraltee, and a still narrower strip along the eastern coasts of Curramulka, Muloowurtie and Cunningham, and over most of the area southwards leaving out the places where the bed rock out-crops.

The elevated tertiary beds, viz., those which cover the high ground and occupy valleys between the low ranges should also contain water. Artesian water is not likely to be found in them on account of the water-bearing drifts, from their elevated position, being continuously subject to drainage. It is extremely difficult to give a decided opinion on a question of this kind, however, as a bore put down at sea level might tap artesian water, while the same water a few yards inland, on the higher ground, would not rise to the surface. In boring, therefore, in these tertiary beds, all that can be legitimately expected is that water will be tapped when porous beds are encountered, and that it will rise to considerable height in the bore, or to the surface.

NOTES ON THE STRUCTURE OF THE MATTERHORN.

BY

E. WHYMPER.

When one observes the great peak of the Matterhorn at a short distance, it is seen that its rocks are separated into three great divisions, of which the middle mass is the largest, and grey in colour, while the upper and lower sections are apparently of a dull red. On ascending the mountain, these divisions are so clearly apparent, and the junctions of the sections are so marked, that it is almost possible to see the lines of separation. The rocks on the upper and lower divisions, however, it is found, are by no means uniformly red in colour, but are interspersed with others of a green and of an iron grey. It is from the red rocks being so much more positive in tone that they present a uniform tint when seen at a distance.

The summit of the Matterhorn is a roughly-lined ridge of 360 feet to 400 feet in length. It is extremely precipitous on one side ; but on the side

which descends towards the glaciers of Zmutt, the inclination is moderate, and it can be traversed with great facility. There are several little points on this side, and the highest of them is usually covered by a small cone of snow. The whole of the summit is covered with disintegrated fragments, and the living rock is not anywhere visible. It was observed by De Saussure that the beds of the Matterhorn rise towards the N.E., at an angle of 45°. This is scarcely exact, although correct on the whole. They dip towards the south and west; but the inclination towards the west is three times as great as it is to the south. In consequence of these dips, the plain surface of the beds presents a surface sloping downwards on the western and southern sides of the mountain, and the fractured edges overhang each other. It is mainly from this cause that so much difficulty has been experienced in all previous endeavours to ascend the mountain; and it was from observing this fact that I formed the resolution to attempt the ascent by the north-western face; for although it appeared smooth and unbroken, yet I argued that the fractures would fall in exactly the reverse manner to that which I have described, and this would render the ascent easy, even although the hold they might afford should be but small. The theory was correct, and the whole of the north-eastern face was found to be, in fact, a long stair-case, with the steps shelving inwards. It is also in consequence of these steps, that stones do not fall to any distance on the north-eastern side; for it is evident that if any disintegrated fragments do break away, they must sooner or later be arrested on a ledge, and, indeed, I did not see any fall during the two days which I passed on the mountain. On the other side, on the contrary, the Matterhorn rains down showers, nay, torrents and avalanches of stones, both by day and night. Thus these dips become on one side a source of safety, but on all others a source of great danger. I was enabled by a knowledge of these facts to account for the enormous moraine of the Zmutt glacier, which has attracted the attention and the curiosity of all observers; for the Zmutt and its tributary, the Tiefenmatter, sweep round the two faces of the Matterhorn, on which I would have expected the greatest masses of rock would have fallen. I found, moreover, that the Furgee glacier, which is below the north-east face, has scarcely any moraine. The consideration of these facts also suggests naturally that the primal form of the Matterhorn on its north-east side can be seen, but that great changes have taken place on the other; I am sure, indeed, of this, for I saw the fallen fragments below. I can go a step further. The fallen masses are chiefly of the red rocks, and they must have either come from the upper or the lower of the three divisions. On the side of the Zmutt and the Tiefenmatter glaciers, however, the lower division is almost entirely covered by snow and glaciers. I am therefore forced to the conclusion that they come from the upper; and it is doing no violence to the imagination to suppose that at some early period the now isolated obelisk of the Matterhorn was only the termination and the culminating point of the ridge, of which the Dest d'Erin and the mountains to the south of it formed also a part.

CURIOUS DISCOVERY OF BONES.

BY

RICHARD BENNETT.

On the 9th of May, 1874, I had some men sinking a well on the Aringa station, six miles on the Portland side of Belfast, the property of Mr. John Ritchie. At a depth of about five feet from the surface the men came upon large boulders of basalt rock; these continued to a depth of seventeen feet, and formed a bed so compact and solid that the men had to blast the whole way through with dynamite. At the bottom of this mass of rock, embedded in yellow clay mixed with ironstone, the whole of which bore traces of fire, the skeleton of what appeared to have been a kangaroo was discovered, but most of the bones were in such a decomposed state that they crumbled to pieces at the slightest touch. A few pieces only which retained sufficient solidity—including some molar, and one large incisor, teeth—the enamel on which was perfect, I forwarded, carefully packed in cotton wool in a small box, to Professor McCoy, at the Melbourne Museum, accompanied by a letter describing minutely the circumstances under which they were found, and giving a description of the geological features of the country in the immediate neighbourhood. My idea is that the animal must have been overwhelmed by lava in a liquid state, thrown out either by Mount Rouse or Mount Napier, or perhaps both of those volcanoes, which are within thirty-five or forty miles, and from whose bases there is a well defined ridge of basaltic rocks reaching to the sea coast, within two miles of where these bones were found. From the immense thickness of some of the strata of basalt, some of them being twelve feet in depth, the volcanoes must have been active for a considerable time; then a period of some duration must have elapsed to allow a deposit of earth, clay, etc., to accumulate; then another outburst from the craters, and a consequent fresh deposit of lava; possibly forming a period of several thousand years since the bones were covered. If this hypothesis of mine is correct the kangaroo must have inhabited Australia, possibly from the commencement of the world's history. The teeth found did not differ in size or shape from the kangaroo of the present day. One great peculiarity in the immediate neighbourhood is, that the principal waterholes are on the summit of high basaltic hills, formed of huge boulders, and the depressions containing the water have, in all probability, been formed by the lava cooling. Many of these hollows were formerly, I imagine, filled with peat, large tracts of which still exist on the low lying

flats in the immediate neighbourhood, and which becoming burnt out on the tops of the hills has left deep funnel-shaped cavities now full of water. Many of these elevated depressions are still filled with peat, and the margins covered with a dense ti-tree scrub. Several large caverns exist in the neighbourhood within a mile of where the bones were found, and it at first suggested itself to me that this might have been the bottom of a cave into which the superincumbent mass of boulders had fallen; but as all these caverns are of a limestone formation, no trace of which existed near the bones, I abandoned the idea; besides, the surface of the ground was not depressed as if there had been a collapse. It is much to be regretted that no notice was taken of my discovery. I am also sorry I did not retain some portions of the bones. Had enquiries been made by scientific men instanter, a further search might have been instituted, and possibly much valuable information obtained. Immediately below where the bones were found the boulders commenced again, and continued until we reached the spring, which was at a depth of twenty-three feet from the surface. That the whole of this portion of the western district was in a condition of very active volcanic disturbance there can be little doubt, and I am sure few parts of Australia would have repaid Mr. Taylor's investigations better. In the neighbourhood of Tower Hill the volcanic ash can be observed in distinct layers where the road has been cut through hills, each successive deposit well defined, evidencing considerable periods of quiescence between the eruptions, as likewise the difference in the composition of the cinders of each layer. The question arises are these volcanoes for ever silent, or may we look forward to renewed activity, not in our time let it be hoped; yet I believe we are with our flocks and herds, pasture, and corn fields but forming another stratum of soil to be again covered with molten lava, forming new fields of research for future geologists and philosophers.

LINKS IN THE ANIMAL KINGDOM.

BY

HEYKEM NABI COSMOS.

The Swatherium is a connecting link between Ruminants and Pachyderms.

The *Mastodon* and *Megatherium*, when examined microscopically, are modelled after the type which we see in our domestic quadrupeds, and in man himself. The gigantic Pachyderms of Australia were between the Mastodon and Dimotherium.

The Pachydermata familics played an important part in the tertiary period. The extinct genera affords important links for uniting in a natural series the several groups of which it is composed.

The ursine opposum, or Australian Devil, has great analogy to carnivora and other classes.

The Anoptotherium had affinities with the rhinoceros, horse, hog, hippopotamus, and camel. It had forty-four teeth, of which six incisors, four canine, and fourteen molars formed a continuous line, uninterrupted by that space between canine and molars which is seen, more or less, in every other animal, man and monkey excepted. It was between the Ruminantia and Pachydermata classes that Cuvier imagined the Anoptotherium, in a great many respects, an intermediate between pigs and ruminants. Its head partook of the form of that of the horse and camel, and did not possess a prolonged snout.

The leptotherium is a fossil form of the S Amber Ruminant.

The Palæotherium connects together animals such as the Rhinoceros, Horse, and Tapir.

The Lophiodon (fossil) differs from the Palæotherium in having six molars on each side of both jaws; fifteen species of this genius have been found.

Between the Tapir and Rhinoceros we have the Daman or Hyrax. In skeleton form it may be said to be a miniature Rhinoceros.

The gradations of change are well seen in the extinct terrestrial reptiles, such as Orinthoscelida, Plethyosaura, Ichthyosaura, Megylosaura, and Plesyosaura.

The Phascolarctor, or Koala, called by the colonists of Australia the native bear or monkey, is entirely destitute of tail. The fore-feet have each five toes, of which two are opposed to the other three, a solitary instance among mammalia. The Phaseolomyidæ (wombats)—an evident representative of Rodentia—they are clothed with a brown woolly hair. The Praemolar permanent pulps, in which respects the Wombat differs from all other marsupials, and agrees with the herbivorous Rodents, and with those Edentata, which have teeth, and with the extinct *Toxodon.*—(Owen).

The Ornithorhynchus, a semi-rodent, called the colonial water-mole, has the body of an otter, and bill of a duck. This draws together mammals, birds, and reptiles; has no true teeth—capacious cheek pouches, five toes with web between them, which it can withdraw at pleasure, feet are directed backwards, so as to allow it to swim as a seal. The foot of the male has a spur like a cock. It catches food in the mud; but, when that is scarce, eats water-weeds. Habitation generally in river banks. The *Ornithorhynchus* and *Echidna* "may safely be considered as relics of a much larger group," have bill and web-feet of swimming birds, former being a semi-rodent, the latter being a semi-insectivora; both of these animals, from the peculiar structure of their reproductive organs, show their near approach to the class Aves. The Ornithorhynchus has brain *(vix gyris sulcisque excepto in cet cerebello notatum.)*

The Virginian Opposum represents quadrumana among ovo-viviparous mammalia. It is born blind, shapeless and naked, and found adhering to the teat of its mother, and remains so till the fiftieth day, when it is found to have acquired to the size of a mouse.

With the Kangaroo of Australia the young are carried about in the mother's pouch till the eightieth day.

Bats and Plerosauria or Pterodactyles are intermediate links between animals and birds; between birds, bats, and lizards there is only one

genus—the Pterodactylus—from the length of its neck and form of its head, which resembles a bird, whilst its anterior extremities were at once feet and wings. This animal was fitted for arboreal life in the forests. It led the life of a bat and swallow when no birds or bats existed. The difference in form from other birds arises from circumstances, habits, and modification required to keep up a complete and harmonious link in creation's scheme.

The *Hesperornis Regalis*, a swimming and diving bird, five or six feet long, was provided with long jaws, armed with teeth, with curved crowns and thick roots, not set in distinct sockets, but lodged in a groove. This bird diminishes the hiatus between reptiles and birds. There is again the *Ichthyornis Dispar*, a bird with teeth, but in distinct sockets, and only rudimentary wings. Its vertebræ have not the peculiar characters of existing birds. Again, the Archapteryx, which to a certain extent occupies a midway place between a bird and a reptile; but the gradation is best seen in the extinct terrestrial reptile, the Ornithoscoelida.

HOLIDAY RAMBLES IN THE AUSTRALIAN ALPS.

BY

JAMES STIRLING, F.G.S., F.L.S

PART II.

Here in the umbrageous shade of a casuarina *(C. suborosa)*, the she-oak, let us rest awhile.

As yon bright orb lights up the panorama with a golden sheen,
Let's contemplate Dame Nature's beauties in a transformation scene;
From eucalyptus forests grand, where giant trees occur,
Clothing in sombre hues each steep Silurian spur;
Or, in moist glens, where each perennial spring survives
The parching summer droughts, and irrigates the soils where denser vegetation thrives
In rich luxuriance with other shrubs. And there, where trickling waters flow,
The aromatic sassafras, the scented native musk, and noble fern-trees grow.
How oft in these deep glens is heard the dingo's mournful cry;
Or else, in mocking tones, the warbling lyre-bird's pert reply.
Anon, from out fork'd limbs of giant gums, there echoes through the air
The harsh yet child-like screech of climbing native bear.
While other sounds, like thud, thud, thud, attract the listening ears—
'Tis but a wallaby from out the thicket hops; a moment seen, then disappears.

Yes, 'tis true! This is indeed a change! A transformation scene from those dense forest glens, where solemn grandeur often reigns supreme, to those bright charming slopes and flats in Nature's park below.

See how yon rolling ridge in undulating graceful curves
Sweeps upwards from that rich flat below, which serves
The settler's purpose. For here are soils which, tilled, and fertilized by rain,
Yield most prolific crops of choicest fruits, and stores of grain.
Sculptured in lovely forms by Nature's soft unerring hand.
The rains, the frosts, and snows have moulded this fair land.
How strange it is those gentle contours form a figure
Most like an ogre curve, with mathematic rigour.
Or else a cone-shaped hillock stands alone,
With rocky out-crops, like some ruined dome.
And browsing o'er its grassy slopes 'tis true
Are those marsupial forms, the weird-like kangaroo.
From those Bursaria seeds to Banksia cones the parrot flies,
While cockatoos and satin-birds their needs from farmers' grain supplies.

But, you ask, is it possible that the rain, the frosts, and snows, that mere atmospheric agencies have carved out the gentle hollows, have produced such polymorphic features in this lovely area. Are there not other causes for these striking contours, for this varied surface configuration? Yes, my friend, there are other causes. The physiographist who would seek to obtain a clue to those mysterious forces which have dominated in the evolution of existing contours, must call to his aid the researches of the geologist as well as those of the chemist and meteorologist. From the latter he will learn that those conditions generated in the laboratory of the atmosphere, that invisible substance which surrounds us; which though "softer than the softest down, more impalpable than the finest gossamer, that leaves the cobweb undisturbed, and scarcely stirs the lightest flower that feeds on the dew it supplies—yet when in motion is able to crush the the most refractory substances with its weight." That those agencies and conditions re-act on the hardened crust of the earth; that the chemical components of the one, by the interaction of still more subtle and recondite forces, affect most powerfully the chemical constituents of the other; or, in other words, from the chemist we learn that in proportion as the rock masses contain certain chemical constituents, so will be the ratios of their denudation and erosion, as affected by atmospheric or aqueous agencies. And this difference of denudation and erosion will often account for the development of physical features, and of landscape effects. From the geologist we learn, as the results of his observations and reasonings, that other and perhaps the original or primary causes of these surface diversities are to be sought for in the *operation* of deep seated volcanic or plutonic forces connected with the earth as a cooling globe, and that these subterranean throes have dominated in the past in producing greater inequalities in the surface. In short, in the words of a celebrated writer, "The main instruments of surface diversity into mountain and valley, table land, and plain, are the volcanic forces acting from within, and the forces of erosion and denudation as persistently acting from without. And so the upheaving of continents, the uppelling of mountain chains and mountains, are the work of innumerable volcanoes, earthquakes, and earth tremors operating through untold ages. And to these combined forces—assisted by the wasting and wearing of air and water, rain, rivers, and glaciers—are to be mainly ascribed the principal features in the vertical relief or superficial diversity of the land." Do you

see that rocky crested mountain which rises high above the ranges to the north of us—whose "capp'd heights appear precipitously steep; those rugged heights are built up of waterworn pebbles resting on uptilted sandstones, and the highest peak is called Mount Tambo. Yes, strange as it may appear, those massive conglomerates, now fully 3000 feet above us, were rounded by the action of water, worn down from pre-existing rock formations, and deposited by aqueous agencies in the bed of an ancient lake or sea, ages upon ages before the limestone rocks, on which we are now reclining, were built up by those lowly denizens of the sea—the coral polype. And when we examine those bold, rounded mountains to the east of us, we will obtain a clue to the agencies which dominated during the past in elevating these massive rocks. And by corrugating and contorting the beds of limestone sediments assisted in forming these ridges, hillocks and hollows, which characterise this charming area. See how strong a line of demarcation exists between the limestone formation and the adjoining rocks, between the thickly wooded slopes of this mountain, Mount Buninyong, and the limestone ridges which rise high up on its western flanks. Again turn to the westward—that high range with bold escarpments of rock on its steep eastern spurs forms part of the Great Dividing Range—the backbone of Eastern Australia. Away low down at its base, like a silvered thread, winds the zigzag course of the Tambo River. And there, nestling in the rich flats on its easern sidc, is the Bindi Homestead. This crcek below us, which has worn its passage down through the limestones, and which rises in the Buninyong Ranges to the east of us, is Bindi Creek, while that deep valley to the south of us marks the course of Junction Creek; and that high coned peak on the opposite side of the valley was ascended, many years ago, by our venerable Chief Justice Stawell, and is now named Mount Stawell in commemoration of that event. Let us now descend this hillside and examine that bluffy outcrop of rocks. I have here a compass for ascertaining the strike of the outcrops, another small instrument called a clinometer for measuring the slope or dip, and also a geological hammer for breaking off chips from the rock masses; here are also a few small phials containing some acids for examining the chemical constituents of the samples we will break off. Now, as our journey is one of mutual instruction, will you kindly take this note-book and jot down a few remarks I will make on the results of our explorations and examinations. First, then, let me pour a few drops of this acid (hydrochloric) on the bluish looking fragment I have broken off. Ah! it effervesces like sodawatcr, and has a peculiar smell; while the other piece of rock which we have carried in our valise from the Tambo River, near Tongio—a piece of slate—is not at all affcctcd by the acid. You would like an explanation of this peculiar property, which causes the acid to effervesce on the one rock and not on the latter. Certainly, the explanation is very simple. That bluish rock, which was so powerfully affected by the acid, is a carbonate of lime (limestone); or, as the chemists call it, calcic carbonate, and the acid we poured upon it (a very powerful and, indeed, dangerous substance to trifle with) is a chemical combination of two gaseous elements —chlorine and hydrogen. Now the chlorine of this acid has, what chemists call an affinity for another substance, not a gas, but a metallic element, which is the principal ingredient of our piece of rock (viz., Calcium). But you recollect our specimen is a calcic carbonate—that is, a combination of lime and carbon, so that before the chlorine can enter

into combination with the calcium it must expel the carbon. Now when we poured the acid on the limestone, the effervesence you observed was in reality a chemical change taking place, the atoms of chlorine were combining with the atoms of calcium to form chloride of calcium (or chloride of lime), that white powder which you see is left on the stone, while the carbon so unceremoniously expelled is, by the laws of chemical affinity, combining with the oxygen gas of the air to form carbonic acid gas, which produces such a disagreeable smell. By this simple test you may always tell whether the rock you are examining is a limestone, or contains lime in any quantity. You have now noted with the compass the direction of the strike, or the line made by the stratum with the horizon, and showing the direction of the stratum across the country, which you found to be N.W. You have also noted the dip, or inclination of the beds, with the clinometer, which is here found to be 60° to the S.W., for, as you will see by-and-bye, the dip is always at right angles to the line of strike. The beds are not of equal thickness, nor yet of equal hardness, some of the bands are no thicker than a piece of cardboard, others are quite four feet thick, some are dark blue and sub crystalline, others are soft and earthy, but stay! what is this marking on that piece you have just broken off with the hammer? Ah! you have made a discovery; it is a fossil, and an interesting one, it is of a characteristic marine organism, or rather the covering of one. A fossil mollusc which will enable us to ascertain the relative age of these limestone rocks and the conditions under which they were formed. That fossil is Sperifora laevicosta. A mollusc of the class Palliobranchiata, order Brachipoda, of Middle Devonian age. And here, in this yellowish lower sand, I have discovered another fossil of different shape, it is a Pterinia, also a mollusc, but what is that you have in the piece of whitish rock you have just broken? Ah that is Atrypa reticularis but this species is not confined to this formation, it is found in the older and underlying palægoic rocks, the upper silurian, but it is here much larger than it is found elsewhere in the silurian sedimentary rocks. Again this short club-like piece of rock with circular rings or markings, what is this? Surely this is not a member of the nautilis family. Yes, it is indeed, for if we turn to page eighteen of "Prodomus of the Palæontology of Victoria," we will find it named as Phragmoteras Subtrigonum, of the class Cephalopoda, order Tentaculifera, hitherto known only from the Buchan limestones, some fifty miles distant. To our learned government Palæontologist, Professor M'Coy, we are indebted for drawings and descriptions of various molluscs hitherto found in Victoria which have enabled us to identify these species.

(To be continued).

PROCEEDINGS OF SOCIETIES.

VICTORIA.

The Geological Society of Australasia.

The monthly meeting of the Geological Society of Australasia was held on Friday, 14th August, at the offices of the society, Market Street, Melbourne. Sir Arthur Nicolson, Bart, was in the chair. After the ordinary routine business had been transacted, Mr. Graham Mitchell, M.R.C.V.S., and Mr. T. W. Kendall, M.R.C.V.S., were elected members of the society. The Honorary Librarian reported that he had received sixteen volumes and fifteen maps as donations to the library of the society, from Messrs. A. J. Skene, T. S. Bulmer, R. T. Litton, and C. H. Wilkinson; and from the Under-Secretary for Mines, New South Wales, and the Secretary for Crown Lands, South Australia. A vote of thanks was passed to these gentlemen for their donations. The Honorary Secretary read a letter which he had received from the Secretary of the South African Exhibition, which is to be held at Port Elizabeth. The writer states, "I am desired by the Executive Committee of the South African Exhibition to thank you for your liberal offer to furnish for exhibition here specimens of your mineral and other resources, which they most gladly accept. Of course, no charge will be made to you for space. I shall be careful to set aside a special stand for your exhibits." The meeting thanked the Honorary Secretary for his action in this matter. The exhibits are to be sent by the next French mail steamer.

The Royal Society.

A meeting of the Royal Society of Victoria was held on Thursday, the 13th of August. Professor Kernot (president) was in the chair. An abstract was given by one of the Honorary Secretaries (Mr. A. Sutherland) of a lengthy paper by Mr. H. d'Esterre Taylor, on "Uniformity in the Collection of Statistics." Mr. Taylor pointed out the vast amount of trouble caused to compilers by the totally different systems adopted in different countries in

the collection of statistics, and, with a view to approaching to uniformity, he advocated that the census should be taken simultaneously on an agreed basis in all British-speaking countries. In the discussion which followed the reading of the paper, the President, and Messrs. Rosales, Griffiths, Fenton, Sutherland, and Moors took part. Mr. Sutherland said that he considered the Victorian statistics the best he had seen. He did not think uniformity would be obtained unless the establishment of some statistical council were agreed upon, and given power to lay down rules. The President expressed an opinion that diagram information was the best, and remarked that it was clear to his mind that the great differences which had arisen in ratios relating to New South Wales and Victoria, were due to the different methods of averaging the statistics, rather than to the actual results. In the course of the evening a paper was read on the dynamical equivalent of a pressure, contributed by Mr. Wakelin, a correspondent of the society in New Zealand.

Historical Society of Australasia.

A meeting of the above society was held at the office on Friday, 14th of August, and some business of an unimportant nature was transacted. Mr. R. T. Litton informed the meeting that he had received an interesting paper on "Blackfellow's Mounds," from Mr. G. Soilleux, and also one from Mr. R. Thomson, to be read at the next public meeting. After some discussion on various subjects, the meeting dissolved.

The Medical Students' Society.

The fortnightly meeting of the Medical Students' Society was held on Thursday, the 6th of August. Dr. F. D. Bird was in the chair, and twenty-eight members were present. A letter from the Registrar of the University, in reply to an enquiry as to what had been done with the petition of the senior students, stated that he had placed the petition before the Council, but nothing further had been done in the matter. A letter was then read from Dr. J. W. Springthorpe, proposing to meet the Society or its Committee in a conference, to discuss the possibility of turning the present newly inaugurated system of clinical instruction to best account, and representing that he had been appointed by the Council for that purpose. A motion was proposed to the effect that, "Whereas Dr. Springthorpe did publicly write that 'the opinion of the students might be ignored,' it be resolved by this Society that no further communications be held with that gentleman until a full withdrawal of such statement be made in writing." Considerable discussion ensued, and at length the motion was withdrawn in favour of the following amendment, which was carried:—"That, recognising the existence of a medical faculty in connection with the Melbourne University, the members of this Society consider it injudicious in the extreme that the council should appoint any individual outside of that faculty to influence the students respecting their medical training, and out of respect to the faculty they must respectfully decline to meet Dr. Springthorpe as the

representative of the council." It was then resolved that steps be taken to try and get the council's demand for three months' certificates for out-patient practice repealed, and it was agreed that a deputation should be chosen by the committee of the society to wait on the council, and endeavour to secure the desired change. Mr. A. L. Kenny then read a paper on "Cocaine." Votes of thanks to Mr. Kenny and the chairman closed the meeting.

Field Naturalists' Club of Victoria.

The ordinary monthly meeting of the Field Naturalists' Club was held at the Royal Society's Hall on Monday evening, the 10th of August.

The President, the Rev. J. J. Halley, occupied the chair, and about fifty members and visitors were present.

The Honorary Librarian acknowledged donations to the library, from the Royal Society of Victoria of a set of their proceedings, and parts of proceedings from the Linnean Society of New South Wales and the Royal Society of Queensland.

The Honorary Secretary read a short account of the Club excursion to Cheltenham, held on the previous Saturday, which had been fairly successful, more especially as regards fresh water crustacea.

The following ladies and gentlemen were elected members of the Club: —Miss Lange, Miss A. Lange, Mrs. Lange, Miss Rankin, Rev. W. T. Whan, Messrs. H. Andrews, I. Batey, W. Brook, Jno. Dennant, C. Frost, M. Gamble, A. J. Hall, F. C. Lange, G. Meyler, W. E. Pickels, R. N. Smith, and Wm. Taylor, whilst several others were nominated for membership.

Mr. C. A. Topp, M.A., read the first part of a paper entitled "A Geological Sketch of South-western Victoria," contributed by Mr. Jno. Dennant, of Hamilton. This gave a general geological description of the district, and a more detailed account of the older formations occurring between the Glenelg and Wando Rivers.

The first part of a paper on "The Habits of Native Birds" was contributed by Mr. I. Batey, of Sunbury, whose observations about crows created some discussion among those present.

Signor P. Dattari, F.I.G.S., informed the meeting that he is compiling a new Dichotomous Botanical Key in the form of a synopsis, by which the genus and species of Victorian plants can be easily determinated, this, which is not pretended to be a compendium of Botany, and will be a very valuable help for the use of the students of Botany.

The following were the principal exhibits:—By Mr. E. Bage, large grey water spider *(Argyrometra aquatica)*, the small red water spider *(Hydractina globulus)*, and three water beetles; also *Apus cancriformius*, or the shield shrimp, taken on Saturday at Cheltenham; by Mr. A. Coles, collection of birds from Townsville; by Mr. F. G. A. Barnard, geological specimens, from Mount Buninyong; by Mr. T. Forbes-Leith, the American migratory thrush and red-winged blackbird, the British song thrush and blackbird; by Rev. J. J. Halley, microscope stand, by G. Baker; by Mr. T. J. Hughes, bird of Paridise; by Mr. H. Kennon, small pearl and dried fishes' eyes; by Mr. J. M'Kibbin, four Victorian orchids, in bloom, and four

species of lizards, with two or three tails; by Mr. F. Reader, fungi *(Polyporus borealis Er.)*, new to Australia, and three species new to Victoria; by Mr. G. Rose, fossils from Cheltenham. After the usual *conversazione* the meeting terminated.

National Agricultural Society.

The ordinary monthly meeting of the council of the National Agricultural Society was held at the office, Kirk's Bazaar, on Tuesday, the 11th of August. Dr. A. Plummer, president, was in the chair, and there were also present—Messrs. J. Buchanan, M.L.C., R. Simson, M.L.C., C. Young, M.L.A., J. Smith, T. Learmonth, J. Garton, T. Brunton, J. Currie, D. R. M'Gregor, J. Hearne, J. M. Peck, D. Munro, F. S. Roberts, C. Lynott, S. Gardiner, and J. Finlay.

The Horticultural Society of Victoria.

The Horticultural Society of Victoria held its monthly meeting in the Eastern Arcade, Bourke Street, on Thursday, the 6th of August. There were present—The President (Mr. Wm. Anderson, M.L.A.) in the chair, and Messrs. Sangster, Bell, Roberts, Draper, Moule, Wilkinson, Beilby, Taylor, Ardagh, Cole, Hutchinson, Stoddart, Murdoch, and Boyce.

Amongst the correspondence was a letter from the Secretary for Agriculture, inviting an expression of the opinion of the society as to the means of coping with the codlin moth, and as to whether legislative action should be taken. A committee of five was appointed to report on the subject at the next meeting.

A letter was received from Mr. W. J. Woods, which, in reply to an inquiry, afforded some valuable information as to the success of black currant culture in the Daylesford district, and showed that this fruit can be grown well and profitably in Victoria in suitable localities.

At the evening meeting, Mr. G. Middlemiss, Moona, New South Wales, exhibited a fine collection of oranges, navel, Mexicana, Compuda, and Parramatta being among the finest. Mr. T. P. Errey, of Cabrico, laid upon the table twenty-seven kinds of apples, comprising fine samples of Northern Spy, Late Wine, Brickley seedling, Cleopatra, Sturmet Pippin, Dunn's seedling, Junalasker. Mr. Rogers, of Camperdown, tabled ten kinds of apples, finely grown, the following being among the list:—Nickajack, Perfection, Rome Beauty, Tusculosa seedling, and Kentucky Red Streak. Mr. Neilson, curator of the gardens, showed a fine table of fruit, comprising eighty-five kinds of apples, all in good condition, and thirty-six of pears (twenty-four of the citrus tribe), including some dishes of St. Michael, Parramatta, and St. Jago, and Thorny, and Emperor of Mandarin, and fine samples of shaddocks, lemons, and citrons.

The South Suburban Horticultural Society.

The usual monthly meeting of the South Suburban Horticultural Society was held at the Coffee Tavern, Prahran, on Thursday evening, the 6th of August. Mr. G. F. Crawford was in the chair.

The Chairman announced that the date of the spring show had been fixed for the 30th and 31st of October.

The judges for the evening—Messrs. H. Coglan and A. Anderson for the open class, and W. F. M'Laine and J. W. Sangwell for the amateur class—reported the following awards :—Open Class.—One orchid first, Mr. J. W. Sangwell, gardener to Mrs. Henty, St. Kilda Road; six pansies second, Mr. H. Haycroft; dish oranges first, dish lemons first, Mr. G. H. Greenwood; one dracœna first, Mr. J. Ross; one fern grown under glass second, one do. not grown under glass first, Mr. W. B. Keyes; six cut flowers second, Mr. W. M'Dougall; one cineraria first, one primula sinensis second, two hyacinths first, Mr. W. F. M'Laine. Amateur Class.—One dracœna first, Mr. P. Brierley; six cut flowers first, Mr. W. Chisholm; one plant in bloom first, one fern grown under glass first, one do. not grown under glass first, Mr. W. B. Keyes; six cut flowers first, three cut bulbs first, one orchid first, Mr. H. Stoddart.

The Richmond Horticultural Society.

The usual monthly meeting of the Richmond Horticultural and Cottage Garden Society was held at the local town hall on Tuesday evening, the 11th of August. Mr. B. W. Holgate was in the chair.

The Secretary reported having received 100 camellia plants for gift distribution in connection with the spring show of the Society.

The judges for the evening, Messrs. F. Bechtold and J. F. Jones, reported the following awards :—One fern under glass first, one fern not under glass second, Mr. J. James; one primula sinensis first, six varieties cut flowers second, one cabbage first, Mr. J. Betts. Mr. J. F. Jones exhibited fine cut blooms of violet (Marie Louise.)

Medical Board.

A meeting of the Medical Board of Victoria was held on Friday, the 7th August, at the Government Offices. There were present—Dr. Youl (in the chair), Dr. Featherston, Dr. Blair, Dr. Shields, Mr. Tweeddale, Mr Hewlett. The undermentioned gentlemen attended, produced their diplomas, and were registered, as follows :—George Robert Moore Graham, Richmond, L. *et* L. Mid., R.Q.C.P., Ireland, 1883; Thomas George Beckett, St. Kilda, L.R.C.P. *et* R.C.S. Edin., 1880, L.S.A. London, 1880; Frederick William Elsher, Richmond, Lic. 1882, F. 1885, R.C.S. Ireland, L. *et* L. Mid., R.Q.C.P. Ireland, 1882; Samuel Hammond, Melbourne, L.R.C.S.E. 1858, L.S.A. London, 1858, L.R.C.P. Edin., 1860; William

Houston Low, Ballarat, L.R.C.S. Edin., 1883; John Finlay Malcolmson, Port Melbourne, L.F.P.S. Glasgow, 1885, L.A.H. Dublin, 1882. Name restored to register—James William Henry Veitch, Mandurang, L.S.A. London, 1849. Additional qualifications—No. 1174, Alexander Sydney Joske, St. Kilda, Ch. B. Melb., 1885.

The Federation of Agricultural Societies.

A meeting of the Council of the Federated Agricultural Societies was held on Tuesday, the 4th of August, at the office of the National Agricultural Society, Kirk's Bazaar. Dr. Plummer presided, and there was also present Messrs. Joseph Taylor, H. S. Parfitt, J. B. Miller, J. H. Connor, M.L.A., James Malcolm, W. Thomson, Joseph Knight, J. Castles, and J. L. Dow, M.L.A.

Mr. Thomas Paterson was elected Secretary, on the motion of Mr. W. Thomson.

Mr. Joseph Knight said that he had been instructed by his Society to bring before the Board certain proposed amendments in the Agricultural College Bill. He did not wish at the present to push the consideration of the matter unduly, although he was conscious of serious defects in the Bill.

A Committee, consisting of Dr. Plummer and Messrs. Knight, Thomson, Conner, and Dow, was appointed to consider the proposed amendments.

Mr. Knight thought that all Agricultural Societies ought to be placed in a more satisfactory condition, and he moved—

"That steps be taken at once to have this Council of the Federal Agricultural Society of Victoria called the Victorian Board of Agriculture, recognised by the Government by the passing of a Bill to that end through Parliament."

The Chairman said that if the Council would pass a resolution empowering Mr. Dow to act in the matter, the latter was willing to bring the claims of the delegates to free railway passes before the Minister of Railways.

Mr. Dow explained the constitution of the agricultural councils in America, where there was no state aid. A small grant of money was all that was necessary to make the Council an exceedingly useful body.

Mr. Knight thought that every facility should be given to delegates to attend meetings. He moved—

"That the Council wait on the Minister of Agriculture to ask for a small grant to carry on the operations of the Board, and to ask the Minister of Railways to grant free passes to the members when attending meetings."

Mr. Taylor (Bairnsdale) had been requested by his Society to bring the proposed reciprocity treaty with Tasmania before the Council. Hop-growing was the chief industry in his district, and if the treaty were passed it would involve in ruin all those engaged in that occupation. There were now 800 acres under hops in this district, and no less than £8000 was spent in picking last year.

A letter was read from the West Bourke Agricultural Society, suggesting that the opinion of the various societies of the colony should be taken as to whether they are in favour of inoculation for pleuro-pnemonia. The letter was referred to a sub-committee.

The West Bourke Agricultural Society.

The usual monthly meeting of the West Bourke Agricultural Society was held at the Lancefield Junction Hotel on the 1st inst. Mr. John Hurst was in the chair, the other members present being Messrs. Morrison, F. Williams, F. W. C. Riddell, J.P., G. Jeans, R. Clarke, J.P.; H. Campbell, T. R. Watt, and A. N. Thomas, secretary.

From the Department of Agriculture a letter was received, inquiring as to the society's experience regarding the depredations of the codlin moth in the orchards of the district. Several members spoke of the prevalence of the pest, but the Secretary was instructed to make further inquiries, and report to next meeting.

Mr. A. H. Hopton wrote with regard to the question of professionally judging dogs and poultry. After some discussion, it was decided to be unnecessary to alter the present system, as no difficulty had hitherto been experienced in obtaining competent judges in these classes.

Letters were received from a large number of the leading agricultural societies of the colony, in response to the society's circular, with regard to the working of the system of giving medals as prizes at shows. With one exception only, the whole of the replies, sixteen in number, were averse to the system, the general feeling being in favour of cash prizes. No further action was taken.

The Secretary read a letter from Mr. A. Graham, resigning his position as a member of the council. It was decided that the Secretary should acknowledge it, and state that it had been accepted with regret. Mr. Morrison then moved, and Mr. R. Clarke seconded, that Mr. Claud W. Hamilton, of Melbourne, should be elected to fill the vacancy, which was carried.

The Zoological and Acclimatisation Society.

The Council of the Zoological and Acclimatisation Society held a meeting on Monday afternoon, 17th August, at their office, 69 Temple Court. There were present—Mr. Robert Simson (the president), Mr. C. J. Jenner, M.L.C., Mr. C. M. Officer, M.L.A., Mr. J. Halfey, Mr. C. Purchas, and Mr. J. C. Tyler. At the conclusion of the meeting, the members visited the Zoological Gardens, Royal Park, and inspected the zoological collection, especially the large number of animals and birds which have been recently received from England and the Continent. It was determined to erect several new enclosures and small buildings for animals that at present have no suitable location.

The following stock, which have been added to the collection, have been received from donors, to whom the council express their thanks:—Two snakes from Mr. John Inglis, Pine Lodge; one kangaroo from Miss A. Teague, Rochester; one bronze-wing pigeon from Mr. Buller, Parkeville; one magpie from Mrs. Newley, Clifton Hill; one wallaby from Mr. Hall, Punt Hill, South Yarra; one native bear from Mr. John M'Mahon, Trafalgar, Gippsland; two wallabies from Mr. John Lewes; one porcupine from Mr. A. E. Bitton, High Street, Charlton; one platypus from Mr. F.

D. Power, Bethanga; two snakes from Mr. E. Hicks, Drouin; three black swans from Mr. J. Cleeland, Phillip Island; one monkey from Mr. George Yeoman, Surrey Road, South Yarra; one black-backed coot from Mr. Johns, Curzon Street, Hotham.

Bibliographical Society of Australasia.

A meeting was held on Friday, 14th August, convened by Mr. R. T. Litton, F.N.S., at his offices, Phœnix Chambers, Market Street, to take steps for the formation of a Bibliographical Society of Australasia. Mr. Litton was elected chairman. After a short address from the chairman, Mr. J. S. Rodgers proposed, and Mr. J. E. Wall seconded, that a Society should be formed, to be called the "Bibliographical Society of Australasia." After a lengthy discussion this was agreed to. The objects of the Society were defined by a resolution to be "The cultivation and advancement of the study of Bibliography, more especially as it relates to the Australasian colonies, and the collection of information for the compilation of a reliable Bibliography of Australasia." Those present resolved themselves into a Provisional Committee. Mr. Litton was requested to accept the position of Honorary Secretary *pro tem*, which he consented to do. It was decided that the next meeting should be announced by advertisement in the *Argus*, and that intending members should be balloted for.

Amateur Photographic Association.

The monthly meeting of the Amateur Photographic Association was held on Tuesday, the 11th August, at the Royal Society's Hall. The President (Dr. Browning) was in the chair. Messrs. Levien, Barrett, Mulvany, Smith, Huggins, and Ardern, of Melbourne; Mr. J. C. Leslie, of Corowa; and Messrs. Williams and Keyworth, of New Zealand; were elected members. A letter was read from Mr. Musgrove, announcing the receipt of the necessary apparatus for photo-mechanical printing by means of the Stannotype process, and asking members to send negatives to him for reproduction. A number of photographs received from the Queensland Photographic Association, and the Philadelphia Amateur Photographic Club, were laid upon the table, and greatly admired. The prints included some very fine specimens of instantaneous work. The President gave a short description of the manipulatory portion of the wet collodion process, and subsequently obtained by its means a transparency in the camera from a wet plate negative, and also a negative from a wet plate transparency, thus showing the whole process of producing the negative and positive. The originals were illuminated by means of the sciopticon, and the demonstration was intended mainly to illustrate the process to those members who, having taken up photography since the advent of gelatine plates, know nothing of collodion, except by hearsay.

Geographical Society of Australasia.

A meeting of the Council was held on the 20th August, 1885, Baron Sir F. Von. Mueller, K.C.M.G., President of the Victorian Branch, in the chair. The following members of Council were also present:—George Gordon, Esq., C.E., Rev. W. Potter, F.R.G.S., J. A. Panton, P.M., F. Scarr, J.P., and A. C. Macdonald, F.R.G.S., Honorary Secretary.

The Honorary Secretary reported receipt of letters from the New South Wales and South Australian Branches, and a considerable amount of general correspondence, including letters from the Commissioner for Lands, Wellington, New Zealand, forwarding maps of New Zealand, statistical and other reports. From the Commissioner of Lands and Emigration, South Australia, forwarding geological and other maps and reports. From H. C. Mais, C.E., Engineer-in-Chief of South Australia, forwarding a copy of his report of a visit to Europe and America, and other subjects, 1883. From the President Geographical Society, Paris, enclosing copies of proceedings 1884-5, as donations to the Society's Library. A copy of Sir Edward Strickland's address read at the second annual meeting of the New South Wales Branch, on the 18th inst., was acknowledged, and the Honorary Secretary was instructed to convey the cordial thanks of the Council to the respective donors.

The Honorary Secretary reported that twelve new members had joined since date of last meeting of Council.

The President read a congratulatory telegram which he had despatched to Sir Edward Strickland, K.C.G., on the occasion of the annual meeting of the New South Wales Branch; and also Sir Edward's reply.

The Honorary Secretary of the New South Wales Branch had intimated that the Coleoptera Lepidoptera and other specimens collected by the members of the New Guinea Expedition at Thursday Island would be forwarded when named and classified.

The fourth ordinary general meeting of members and founders was fixed to be held between the 1st and 16th of September next, and the following programme was adopted:—

1. Explorations in Western Tasmania—Chas. Pricy Sprint, Deputy Surveyor-General of Tasmania. 2. A few days ashore in West Kimberley —J. A. Panton, P.M. 3. Some account of the Society's expedition for the scientific exploration of New Guinea—A. C. Macdonald, F.R.G.S.

NEW SOUTH WALES.

No reports to hand.

QUEENSLAND.

No reports to hand.

WESTERN AUSTRALIA.

No reports to hand.

SOUTH AUSTRALIA.

No reports to hand.

TASMANIA.

Royal Society.

The monthly evening meeting of the Royal Society of Tasmania was held on Tuesday evening, 14th July, Mr. James Barnard, Vice-President, occupying the chair. There were fifty-six Fellows in attendance, amongst those present being the Bishop of Tasmania (Dr. Sandford), the Acting-Chief Justice (Hon. W. R. Giblin), and several ladies.

Dr. A. Bingham Crowther, and Mr. R. R. Rex, were re-elected Fellows of the Society.

Owing to the indisposition of the Honorary Secretary, for whose absence the Chairman apologised, the Curator of the Museum brought forward the usual returns, viz :—

1. Number of visitors to the Museum during the month of June :—Week days, 1155 ; Sundays, 570 ; total, 1725.

2. Number of visitors to Royal Society's Gardens during the month of June, 4550.

PRESENTATIONS TO THE MUSEUM.

Mammals :

Two Grey Opossoms, Phalangista vulpina ; Three Black Opossoms, Phalangista fuliginosus : Two Ring-tailed Opossums, Phalangista viverrina, Mr. W. Lester.

Two Tasmanian Tigers, Thylacinus cynocephalus ; One Tasmanian Devil, Sarcophilus ursinus, Mr. W. Turvey.

Duck-billed Platypus, Ornithorhynchus anatinus, Mr. John Swan.

Two Ring-tailed Opossums, Phalangista viverrina, Mr. T. M. Atkinson.

Ring-tailed Opossum, Phalangista viverrina ; Golden-bellied Beaver Rat, Hydromys chrysogaster, Mr. A. Brent.

Birds :

Two Musk Ducks, Biziura lobata, Mr. R. Read.

Blue Crane, Ardea Novæ Hollandiæ, Mr. L. Massey.

Mandarin Drake and Duck, Aix galericulata ; Javanese Pheasant, Phasianus sp., Mr. E. D. Swan.

Ten species of American Birds' Eggs, Mr. Geo. Hinsby.

Fishes:

Tail of an Indian Stinging Ray, Mr. W. H. Buckland.

Crustacea:

A Hermit Crab, Pagrus sp., Mrs. John McCance.

Relics, etc.:

A Paper, *The Saunders News Letter*, Friday, May 16, 1777, Dublin, Mr. J. F. Echlin.

Two Swedish Coins, Mr. L. O. Laroson.

Mr. W. F. Ward, A.R.S.M., Government Analyst, read a paper on the Impurities of Water in Relation to Typhoid Fever. The paper was of some length, and was exceedingly interesting. Messrs. R. A. Bastow, R. M. Johnston, A. B. Crowther, B. Perkins, and Ward spoke in the discussion which followed the reading of the paper.

The Curator read a paper by Baron F. Von Mueller, K.C.M.G., entitled "Notes on Jean Julien Houton Labellardiere, botanist of the search expedition sent out under Admiral D'Entrecasteaux to ascertain the fate of Count La Perouse and his crew." The paper was accompanied by a photo-lithograph of Labellardiere, a copy of which will be inserted in the proceedings of the society for the year.

Mr. C. J. Atkins read some notes on the sea-worm Synapta, illustrated by Polarized Light. He said:—The class Echinodermata includes the marine objects known as the sea-hedgehogs, sea-urchins, and sea-eggs. The members of the group generally develop a calcareous skeleton (set with spines) as an outer covering or integument. The body is globose or cylindrical, and a ring of nerve branches issues from the mouth. The genus of this class called Synapta are cylindrical in form, the body being traversed by an alimentary canal, and the mouth is surrounded by a fringe of radiate feelers, which are the ends of the nerve system of the animal, and serve the purpose of drawing in its food. A skeleton of calcareous plates exists below the tough outer skin, and embedded in these plates are curious anchor-like appendages, which protrude through the skin, giving a rough or rasp-like appearance to the worm. The anchors are used both as an assistance to the Synapta in its movements, and for fixing itself in the mud or sand; they are attached to the anchor-plates, and are immovable. The Synapta is common on the coast of the south of France, and on other shores of the Mediterranean, also in those of the Red Sea. Dr. Herapath mentions the species galliennii as being obtained by him at Torquay, England. (Quart. J. Microscopy, 1865.) It is generally found in burrows in the sand, and is difficult to collect as a perfect specimen, owing to its dividing into separate pieces when handled. The anchor-like spiculæ and plates appear as very brilliant objects when polarised, and I have placed under the microscopes specimens of them this evening.

Mr. Saville-Kent, in reply, said:—I have much pleasure, in illustration of of the paper last communicated, in exhibiting to the society living examples of the genus Synapta, dealt with by Mr. Atkins, and also of a yet rarer, but closely allied form belonging to the genus Chirodota.

THE MICROSCOPE.

A most interesting feature of the evening's proceedings was the microscopic exhibition which took place at its close, illustrative, to some extent, of the papers read. There were seven microscopes on the table, five of them binoculars, viz., three of Ross', one of Baker's, and one of Smith's. Mr. Atkins' very fine Ross instrument was used for the display of the

various features of the Synapta suriniensis referred to in his paper, their peculiar formation and anchor-like appendages creating much wonderment. As seen in the field of the microscope, these latter have the perfect form of a ship's anchor, and the objects seen under the influence of polarized light display the most brilliant iridescent tints. Synapta and bacteria were similarly exhibited by Mr. Saville-Kent, F.L.S. Some very beautiful mounted specimens of mosses were shown by Mr. R. A. Bastow, among them Andræa petrophila, Sphagnum obtusifolium, Paascum apiculatum, and Fissedens bryoides. Mr. Bastow's paper was postponed until a future evening.

A CELEBRATED PICTURE.

On the table was exhibited an oil painting of an English salmon by S. Rolfe, the celebrated fish artist, who is familiarly known as the Landseer among fishes. In addition to his contributions to the Royal Academy, he painted many of the casts of salmon and other fish made by the late Mr. Frank Buckland, and exhibited in the South Kensington Museum. Our own museum is also the fortunate possessor of two of these artistically executed casts.

VOTE OF THANKS.

Mr. Justin Browne, in rising to propose a vote of thanks to the authors of papers, and the donors of gifts to the Museum, said that it must be gratifying to the members of the society to note the tone of the papers, and their scientific tendency during the last two years. Previously we used to count our scientific members by ones and twos; now we seemed to be getting more science men amongst us. (Applause). It might not be known to everyone present that the last speaker, Mr. Saville-Kent, had spent a great part of his life upon a work which had given him a great reputation. The Society had this book, which would well repay any time spent in examining it. Another speaker had passed ten years in Manchester, carrying out sanitary measures, which all civilized people now considered as essential. Such addresses as we had heard to-night would give a tone and a scientific turn to our papers which would add to the Society the scientific character which it was presumed to possess under the name of the Royal Society. (Applause).

Bishop Sandford, in rising to second the motion, said that he could say but very little after the able manner Mr. Brown had proposed the vote; he would, however, merely state that he was of opinion much might be done in keeping in check most of these diseases that were so fatal in many cases. (Cheers). He was glad to see some members of Parliament present, and trusted that what they had listened to this evening would tend to encourage them to vote for strict sanitary measures. (Applause).

Dr. H. A. Perkins, in supporting the motion, said that no doubt the Fellows were aware that a Public Health Bill was shortly to be introduced by the Government, but he was sorry to see that the power in some cases to deal with this important matter was to be left in local hands, which, in his opinion, would not tend to work satisfactorily.

The motion was carried by acclamation.

NEW ZEALAND.

No reports to hand.

NOUMEA.

No reports to hand.

THE EDITOR'S CHAIR.

Professor C. E. Bessey, of the Iowa Agricultural College, says of the the corn smut in the *Student's Farm Journal*:—"This disease of Indian corn is well known to be due to a minute parasitic plant which gains access to the corn plant early in the life of the latter. Careful microscopical examinations show the parasitic growths to be present even in the lower joints of the corn, and they have been seen in all the intermediate parts. The parasite grows in the form of very minute slender threads, which penetrate the tissues of the corn, and thereby gain nourishment for growth. The threads grow until they finally reach the young kernels, where they find such an abundance of nourishment that they burst out into the two well known smutty growths, which are so common some seasons. Now these smutty growths are the fruiting places of the parasite. Cut open such a growth when it is young, and you will find it to be white and of a fibrous structure. A little later it begins to show dark streaks, and still later it begins to dissolve into a black, inky slime. The water soon evaporates from this slime and leaves a powdery mass, which puffs out and blows away with the slighest jar. This powder is made up of countless myriads of little black balls, called spores, which serve to reproduce these plants, as seed reproduce the higher plants. Now, every smutted ear left in the field is a seed-bed for the production of more smut the next year. It has been shown by experience, as well as by direct experiment, that there is always more smut in those fields where there had been smut the year before.

The last bulletin published by the Russian Ministry of Finance gives some interesting information about the agricultural and commercial condition of Western Siberia. The central region of the Obi and the Irtisch is noted for its magnificent pasturage and cornfields, the latter yielding 2,200,000 tchetverts of grain in an average year. The wandering Kirghese tribes excel in the raising of stock, and upon the steppes bordering upon

the Irtisch there are 1,200,000 head of cattle. There are a great many manufactures in the country, and they supply nearly the whole of Western Siberia. Upon the other hand, the lower course of these two rivers offers a striking contrast. Even as far up as 700 miles from its mouth the Obi is from one to two miles broad, and towards the mouth itself it is as much as thirty miles across. The banks become more and more thinly inhabited, vast marshy plains extending out towards the sea, inhabited by a few nomad tribes. The climate in the region is very severe, and during the winter, which lasts from September until May, the snow storms are terrible in their effects. The ice does not generally break up before the latter part of June, and the summer is cold and rainy. The sedentary part of the population earn their living by fishing and shooting, and in the vicinity of Tomsk and Tobolsk the fish, which is taken in large quantities, is frozen and sent off to Russia. The inhabitants have for a long period done very well with the game which they have killed, but of late years such a vast area of forest has been cleared that game of all kinds is much less abundant than it was. At Tobolsk the women make fur coats and pelisses, besides gloves made of reindeer and goat skins. The trade in squirrel skins is very large also. Most of the animals are snared, a gun being rarely used, and the nomad tribes are principally engaged in their pursuit, the Russian inhabitants preferring to dress the furs and sell them. Obdorsk, which has a population of 500, and is situated at the extreme limit of the region which is inhabited, is celebrated for its fur trade, the fair held there every December attracting dealers from all parts of Siberia, Archangel, and the North of Russia generally, who bring with them corn, manufactured goods, and spirits of wine, which they give in exchange. No exact figures are forthcoming as to the number of skins sold, but they may be estimated approximately at 500,000 squirrel skins, 10,000 white fox, and 15,000 ordinary fox skins, while Obdorsk itself supplies as many as 12,000 reindeer hides and as many fox skins.

The committee of the International Ornithological Society, appointed at the Congress held in Vienna, have forwarded a communication to the Imperial Academy of Science in Vienna, requesting that they will arrange for the appointment of persons willing and capable of making regular observations at different stations, all over the globe, in regard to the migration and habits of birds. Publications giving the observations made at the different stations will be published yearly.

Mr. W. Allbones, of Brigg, Lincolnshire, is this year taking out a fresh consignment of stoats and weasels to the number of about 160, which he has procured from various parts of Lincolnshire, for the Government of New Zealand. The weasels and stoats are kept during the voyage in specially constructed boxes, lined with zinc, three in a box, and to feed them during the voyage 2400 live pigeons are taken, and sixteen quarters of Indian corn for the consumption of the pigeons.

Rheumatism.—In the interesting paper on the treatment of rheumatism, published in a recent number of *Land and Water*, no mention is made of salicylic acid, which is somewhat surprising. It is, of course, quite possible that this drug may have been prescribed by veterinary surgeons in cases of rheumatism attacking dogs, and that the result has been such as not to justify them in continuing the treatment. We should hardly think this likely, however, as the salicylates are now so universally prescribed for the cure of the disease when it attacks man. Dr. Chateris, in his "Handbook of Medicine," speaks unhesitatingly of the benefits

derived from salicine in lowering the temperature and diminishing the length of the malady. Dr. Maclagan, according to the *British Medical Journal*, has used salicylic acid in every case of acute rheumatism which has come under his care since November, 1874, and invariably with the same result—a rapid cure of the disease. Dr. Stricker, an eminent German physician, writes in the *Berliner Klinische Wochenschrift* for several months past all the cases of acute articular rheumatism in Professor Traube's wards have been treated with salicylic acid. In all the patients thus treated not only has there been arrest of the increase of temperature within forty-eight hours—generally much sooner—but they have been freed from the local symptoms—swelling, redness, and tenderness of the joints. Dr. Broadbent is of opinion that we have in salicylic acid a remedy for rheumatic fever, comparable to quinine as a remedy for ague. In cases of lumbago guarana has been prescribed with the happiest results, and the hypodermic injection of morphia is strongly recommended by some writers.

Chionodoxa Lucillæ.—This charming spring-flowering plant is also known as the Glory of the Snow. It bears flowers like those of the Siberian Squill *(Scilla sibirica)*, but more star-shaped, colour blue, with a white centre. It is perfectly hardy and of easy growth, and whether in pots or planted out in the open ground it does equally well. It should have a rich, deep sandy loam, in which it can root freely. We can heartily recommend it, having at the present moment several plants in flower.

Philesia Buxifolia.—If only this beautiful plant were capable of general cultivation! It is a well-known, but, at the same time, scarce Chilian evergreen, which has now come to be grown much more successfully as a hardy plant than when treated as a greenhouse plant. It bears large and handsome solitary flowers, somewhat resembling in shape and colour those of *Lapageria rosea*. It appears to do best when planted out in a well-drained position, partially shaded, in deep peat, chopped sphagnum, and abundance of white sand, in which compost it runs freely.

For years past the military returns have proved the Cape to be one of the healthiest parts of the world. They afford a valuable comparison from the fact that owing to the extent of the Imperial sway the British soldier is met with under every sun and in almost every clime, quite cosmopolitan in this respect, and far different from the forces of any other country. A striking instance of the age frequently attained in our healthy climate was shown in the columns of the *Cape Times*, when in five death notices appearing consecutively an average of seventy-eight years was shown. Of these the highest age attained was ninety-nine, while the lowest was sixty-three; and four of the deceased were women. All this goes to support the claim of the Cape, now well established as an important health resort.

A rather amusing incident in connection with diamond stealing is mentioned by a Kimberley paper. An overseer at one of the mines noticed a native labourer put something into his mouth whilst working, and rightly surmised that he was endeavouring to conceal a diamond. Rushing up to him, he found that the wily black was equal to the occasion and succeeded in getting the diamond, which must have been a very large one, partly down his throat, where it could be felt. For some time it seemed to be a case of suffocation with the nigger, who at length managed to get the diamond down his gullet, notwithstanding every effort being put forth to induce the precious gem to take an opposite course.

This has been the severest winter known in the United States for many years, and in addition to the loss of life among the Western farmers, the sacrifice of beasts has been unprecedented. In Kansas and Montana in some districts over fifty per cent. have perished. According to a letter from Kansas the scenes on some of the ranches are frightful. When the weather is very severe the cattle herd close together, and, huddling closer and closer, gradually "pile up" upon one another, when the weaker of course perish. Even ranche-owners who had plenty of fodder were obliged to keep men constantly at work with pitchforks to keep their cattle from piling up. The result is that heaps of dead cattle are to be found throughout the grazing States and territories. All this is due to sheer carelessness and negligence. No preparations are made for housing the cattle, nor is fodder systematically provided, though it would be easy to do this at small expense. The supply of water at such times also is really as insufficient as in Queensland during a drought.

The Banana.—*Musa Cavendishii*, or, as it is sometimes called, being a native of China, *M. Sinensis*. But the genus contains many highly ornamental species and varieties, some of which, but not all, produce delicious fruits known as the banana and the plantain. They appear to be indigenous in all tropical countries, and so much are they esteemed that great attention is bestowed upon the raising of superior bearing varieties. Thus, in Jamaica, Trinidad, and other tropical islands an immense number of varieties are cultivated under local names. The fruits are eaten in a raw state, as well as stewed and fried; in either way they are exceedingly delicate and nutritious. It is because of its dwarf habit that *M. Cavendishii* is so much grown in this country, seldom exceeding 5 ft. or 6 ft. in height. This species does not require great heat to bring it to a fruiting state, and on account of its low stature it can be accommodated where the taller growing species could not find room to develop. The leaves are oblong, two to three feet in length, one to two feet wide, and of a deep green colour. All the *Musas* require rich soil, and at the time of fruiting should be stimulated by the application of liquid manure, if, as is frequently the case, the root space is limited and sustenance deficient. The soil should be made up of about two parts rich loam and two parts decomposed manure and leaf mould, to which should be added a liberal quantity of clean river sand. Good drainage is indispensable and copious applications of water. Propagation is carried out by means of suckers (at least of such kinds as throw them up), which is generally at the time of fruiting. Those that do not throw up suckers can be increased only by means of seed.

Land and Water says:—"With the increasing facilities for rapidly and cheaply visiting Australia, it is not unlikely that a considerable portion of the annual tourist traffic from the United Kingdom will become diverted to New South Wales, where there is much to repay the labours of those in search of the picturesque and beautiful. The famous Blue Mountains, with their wealth of grand and imposing scenery, are easily reached by railway from Sydney; and from the summit of Mount Victoria, where there is a railway station and several hotels, most enjoyable trips may be made to the wilder and lesser known portions of this romantic region. Among these is Mount Wilson, the surroundings of which almost baffle description. Countless tree-ferns, from ten to forty feet high, with emerald green, perfectly formed and wide-spreading fronds, intermingle in prodigal profusion with sassafras trees, and that most gorgeous of all the mimosas which has leaves like, but far more striking than the pepper-tree (*Schinus molle*),

with countless other kinds of shrubs and trees, any one of which would form a conspicuous ornament anywhere. Martin's grand picture of the Garden of Eden, the lovely picture of the Palace Beautiful, in one of the *editions de luxe* of the 'Pilgrim's Progress,' or some of the best views of Brazilian forest scenery, may give some idea of the Mount Wilson vegetation, but only an idea, for the reality surpasses all pictures. No art could create a garden one-twentieth part as beautiful as this glorious hill-side, formed in the midst of sandstone mountains by this basaltic outcrop. The same soil and vegetation continue during the entire ascent of the mountain. At the top of the ridge, in close proximity to each other, are four or five cottages, with flowers, tree-fern, and ornamental plants in the lovely enclosures surrounding them. One of these is embosomed in flowers, the most conspicuous among which are many varieties of the gladiolus and the phlox, and the clover paddocks being as green as Nature ever painted. Looking north, the Liverpool Range, just over Murrurundi, is plainly visible like a faint blue cloud, the distance being fully eighty miles. In the immediate foreground is a wild country of rugged mountains and profound valleys, through which the foot of man never trod. Looking south, the most conspicuous objects are Mount Hay, Mount George, and Mount Tomah, and the wonderful gorge of the Grose, with other summits of minor importance—the whole making a landscape on which the memory is glad to dwell."

The *Sydney Morning Herald* says:—"On Saturday last Captain Wagstaffe, of the ship La Hogue, liberated a number of English birds, which he brought out with him last voyage, at Burnt Bridge Creek, Manley. They were mostly chaffinches, green linnets, and yellow-hammers, all insect-eating birds. Captain Wagstaffe writes:—'I chose near the creek so that they would know where to find water. The little creatures were no sooner out of the cage than they flew to the water, and immediately took a good bath after their long voyage from England. We watched them for some time, and they seemed perfectly at home in this their new country. This creek lies about two miles from Manly, quite in the bush; and I hope they will not get shot by some of the boys we have about Manly and neighbourhood.'"

Jamaica, as is well known, is particularly rich in ferns. Although the island is comparatively so small, it contains about five hundred species of ferns, which is one-sixth of the ferns of the whole world. To express its richness in another form, it is mentioned in the last report of the Botanic Gardens of Jamaica, that within an area about the size of Wales, Jamaica contains twelve times the number of ferns found in the British Islands, and more than ten times the number of ferns found in the whole of the United States. The Jamaica ferns are remarkable not only for their number, but also for their great variety and beauty. They are found in all sizes, from those scarcely a quarter of an inch long to large, tall-growing trees forty to fifty feet high, and with stems six feet in circumference. Again, they are widely distributed, and found in all districts, from the arid plains of St. Catherine and Clarendon, to the highest peaks of the Blue Mountains, from the calcareous rocks of the northern coasts, bedewed with ocean spray, to the cloud-capped ridges of the highest mountains.

The death of Dr. Nachtigal is announced, who, it will be remembered, played an important part in the German annexations on the west coast of Africa. He was on his way home at the time to make report to the German Chancellor on his mission. No particulars of his death have come

to hand, and it is not even known where he breathed his last. His political career has been short but unique. Within the last twelve months Germany has entered the band of colonising powers, and Dr. Nachtigal was the instrument chosen by Prince Bismarck to carry out his policy of annexation, in Africa at least. The Chancellor has often expressed his pride in the sterling qualities of his "more immediate countryman" of the Old Mark of Brandenburg, and it doubtless gave him pleasure to think that the man whom he found worthy to entrust with the execution of his latest schemes of foreign policy first drew breath near his own family estate of Schönhausen.

Mr. Gamble, the Hydraulic Engineer for the Cape of Good Hope, in his official report prepared for Parliament, thus refers to the subject of desiccation, on which, from his varied experience, he is entitled to speak with some authority. "I have been investigating," he says, "old records and books of travel with a view of endeavouring to discover how far the statement is true that South Africa is drying up. There is little doubt that many springs and streams are not so constant as they used to be, but is the cause of this a deficient rainfall, or some failure of the rain to reach the underground strata, from whence the springs are fed? Rainfall records do not reach back very far, the longest register is that kept at the Royal Observatory for forty-five years. This shows no falling off of rainfall in this neighbourhood. Travellers seventy and a hundred years ago described the Karroo and its droughts in much the same terms as we do now, I cannot believe that any considerable climatic change has taken place in historic times. But I have no hesitation in saying that the reckless cutting down of bush and trees both by natives and by white men, as well as the burning of bush and grass so extensively practised, has prevented the rainwater from sinking in to feed the springs. I have seen numbers of places that used to be "riet vleys' in the memory of man, and were in that condition suitable for feeding springs, which are now bare 'vloors' intersected by deep gullies. Off these the rainwater flows without sinking in. Overstocking leads to the same result. The only remedies are fencing and planting on an extensive scale, and, where practicable, the making of artificial lakes."

IMPORTANT NOTICE.

We have much pleasure in informing our readers that in our October number will appear a portrait of James Stirling, Esq., F.G.S., F.L.S., F.B.S.A., Etc., Etc., the well-known Australian geologist.

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The Secretaries of the various scientific societies are particularly requested to forward on as early a date as possible, reports of their meetings, so as they may be published in the next issue.

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